1894

Seventh Annual Report of the Agricultural Experiment Station of the University of Tennessee to the Governor, 1894

University of Tennessee Agricultural Experiment Station

SEVENTH ANNUAL REPORT

OF THE

Agricultural Experiment Station

OF THE

UNIVERSITY OF TENNESSEE

TO THE GOVERNOR

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KNOXVILLE, TENNESSEE:
OGDEN BROTHERS & CO., PRINTERS AND STATIONERS.
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Bulletins of this Station will be sent, upon application, free of charge, to any Farmer in the State.

THE AGRICULTURAL EXPERIMENT STATION

OF THE UNIVERSITY OF TENNESSEE.

The Station has facilities for analyzing and testing fertilizers, cattle foods, milk and dairy products; seeds, with reference to their purity or germinating power; for identifying grasses and weeds, and studying forage plants; for investigating the diseases of fruits and fruit trees, grains and other useful plants.

The Station Bulletins and Reports will be sent, free of charge, to any farmer within the State.

Packages by express, to receive attention, should be *prepaid*.

All communications should be addressed to the

SECRETARY OF THE
AGRICULTURAL EXPERIMENT STATION,
KNOXVILLE, TENN.

☞ The Experiment Station building, containing its offices, laboratories and museum, and the plant-house and horticultural department, are located on the University grounds, fifteen minutes walk from the Custom House in Knoxville. The Experiment farm, stables, milk laboratory, etc., are located one mile west of the University, on the Kingston pike. Farmers are cordially invited to visit the buildings and experimental grounds.

Bulletins of this Station will be sent, upon application, free of charge, to any Farmer in the State.

REPORT TO THE GOVERNOR.

Letter of Transmittal.

KNOXVILLE, TENN., January 8th, 1895.

To His Excellency, PETER TURNEY,

Governor of Tennessee:

SIR:—We have the honor to submit herewith the Seventh Annual Report of the Agricultural Experiment Station of the University of Tennessee. This report is made in accordance with the Act of Congress, approved March 3rd, 1887, and the Act of the General Assembly of Tennessee, approved March 28, 1887. Section 5 of the first mentioned Act contains the following: "It shall be the duty of each of said Stations, annually, on or before the first day of February, to make to the Governor of the State or Territory in which it is located, a full and detailed report of its operations, including a statement of receipts and expenditures; a copy of which report shall be sent to each of said Stations, to the Secretary of Agriculture, and to the Secretary of the Treasury of the United States."

Hoping that the report will prove satisfactory to your Excellency, we remain, with great respect,

Your obedient servants,

M. P. JARNAGIN,
Chairman Experiment Station Committee.

CHAS. W. DABNEY, JR.
President of the University.

J. W. GAUT, *Secretary of the Board of Trustees.*

TREASURER'S REPORT.

The Agricultural Experiment Station of the University of Tennessee, in account with the United States:

	Dr.		*Cr.*
1893		By Salaries	$8,146 66
July 10—To United States Treasury draft	$3,750 00	Building account . .	750 00
" 19—To Heat, Light and Water account; this amt. repaid at this date by C. C. Sullins & Co; erroneously paid to them on March 17, '93	$18 35	Library account . .	174 30
		Publishing & Printing	1,314 79
		Traveling Expenses	49 83
		Stationery & Postage	145 93
		Contingent account .	329 01
		Labor account . . .	2,385 87
		Farm account . . .	326 13
		Heat, Light & Water	442 68
		Chemical account . .	527 24
		Botanical account .	184 17
Oct. 7—To United States Treasury draft	$3,750 00	Janitor	60 00
		Horticultural account	163 39
1894		Bal. on hand Jan. 1, '94	18 35
Jan'y 8—To United States Treasury draft	$3,750 00		
April 9—To United States Treasury draft	$3,750 00		
	$15,018 35	Total	$15,018 35

(Signed) JAMES COMFORT, *Treasurer.*

This is to certify that, as the authorized Auditing Committee of the Board of Trustees of the University of Tennessee, we have examined the accounts of the Treasurer of the Agricultural Experiment Station for the fiscal year ending June 30th, 1894, and find them correct; that the above is a true balance sheet corresponding with said accounts; that the said accounts show no more than seven hundred and fifty dollars was expended for building, and that there is a cash balance of $18.35.

(Signed) J. W. GAUT, F. A. R. SCOTT, S. B. LUTTRELL, *Auditing Com.*

We hereby certify that Messrs. J. W. Gaut, F. A. R. Scott and S. B. Luttrell are the authorized Auditing Committee of this Board of Trustees.

(Signed) CHAS. W. DABNEY, JR.,
President of the University of Tennessee

(Signed) J. W. GAUT, *Secretary.*

Personally appeared before me, W. W. Lee, Notary Public, the foregoing signers, personally known to me to be trustees and officers of the University of Tennessee, who made oath in due form of law that the above statements are true to the best of their knowledge, information and belief.

(Signed) W. W. LEE, *Notary Public.*

(SEAL)

REPORT OF THE PRESIDENT.

To the Experiment Station Committee and the Board of Trustees of the University of Tennessee:

GENTLEMEN:—I have the honor to present herewith, in compliance with the law establishing the Agricultural Experiment Station, the Seventh Annual Report of its operations, for the calendar year ending December 31, 1894, together with the Treasurer's Report for the fiscal year ending June 30, 1894:

By order of the Board of Trustees, at their annual meeting in June, 1893, the organization existing prior to the first of July of that year was changed. The office and title of Director of the Station was abolished, and the duties of the Director as previously fixed were transferred to the President, who shall be assisted in the correspondence, and in such other ways as he might designate, by a Secretary.

During the year ending July 1, 1894, the active members of the Station staff were as follows:

CHAS. W. DABDEY, JR., *President.*
CHAS. F. VANDERFORD, *Secretary.*
F. LAMSON-SCRIBNER, *Botanist.*
DR. C. W. DABNEY, JR., *Chemist.*
R. L. WATTS, *Horticulturist.*
S. M. BAIN, *Assistant Botanist.*
J. B. MCBRYDE, *Assistant Chemist.*
C. E. CHAMBLISS, *Librarian and Clerk.*

By the Board of Trustees, at their annual meeting above referred to, it was declared that "The College Farm shall constitute the Experiment Station Farm, and shall be devoted to the general purposes of experiment operations." The work of the Station, whether conducted in the laboratory or on the farm, shall be, as far as possible, of a practical character, and upon questions of interest and importance to Tennessee agriculturists, so as to bring the Station in close touch with the wants and sympathies of the farmers, planters and stock-raisers of all the different sections of the State."

It was further directed that "the entire proceeds of the sale of stock and products of the farm shall be devoted to the keeping up of the sup-

plies of stock and farm implements, and making repairs and permanent improvements upon the farm and buildings as the Board may order."

The farmers of Tennessee are earnestly seeking how best to diversify their industries, that they may avoid the frequent disasters which seem to accompany the growing of staple crops alone. They are entering upon untried methods by which they hope to obtain fair rewards for their labor, and are everywhere met by the difficulties and uncertainties which attend all new enterprises. They are asking how to use fertilizers so as to increase the yield per acre without increase of cost of product; how to clothe their bare fields with nutritious grasses; how to reclaim the vast areas of once productive lands now regarded as almost worthless; how best to use the coarser forage stuffs too often suffered to waste upon the farm. In every department of agriculture and horticulture they are demanding, as they have a right to do, that the trained workers of their Experiment Station shall endeavor to solve for them some of the difficult questions presented to their daily experience.

The action of the Board of Trustees was taken with a full appreciation of what are the plainly apparant duties of the Station. The policy so outlined has been adopted by the Station staff, one and all; and to its fruition every person employed has given his best service.

Upon the Station Farm we have set on foot and are steadily pursuing experimentation in such lines and in such ways as will enable us to answer, with greater or less accuracy, the many questions of interest pressed upon us by the people of Tennessee.

Probably the most important investigation upon which we have entered is to ascertain the adaptability of grasses, especially those which are perennial, to the various soils of the State. We have sought to do this work in two ways: first, by establishing upon the Station Farm a garden of grasses, where could be tested the various perennials suited to our climate and soil conditions, and to produce as quickly as possible grass seeds of known purity, and plants of such as are not easily propagated from seed, for distribution throughout the State. Those who know the difficulties encountered in any attempt to grow grasses by what is termed pure culture,—that is, the growing of any given grass in a plot without admixture of other varieties,—will understand why such an enterprise cannot be successfully carried through to success in any short period of time. We have already been able to send out to several sections of the State both seeds and plants sure to add very much to the value of the woodland as well as open pasturage. This work will be continued upon its present lines, and further additions will be made to the number of varieties now grown for this purpose, whenever opportunity shall permit; secondly, that farmers may know as completely and as accurately as they should the character, value, habits, and uses of the

native as well as the introduced grasses of the State, it was decided to prepare and publish, to be distributed as widely as our means would permit, a bulletin illustrating as nearly as possible every grass, good, bad or indifferent, now growing in the State. This work was intrusted to Professor F. Lamson-Scribner, Botanist, and was diligently prosecuted until complete.

Early in the fall of 1893, measures were taken to transfer the most important work of the Horticulturist to the Station Farm, upon which are found many acres admirably suited in soil, location, and exposure for such work as is most desirable in this department. The work of converting an almost useless steep hillside into a series of terraces to be planted in pears, grapes, and other fruits, best adapted to the peculiar conditions there existing, is now well under way. The labor of men and horses upon the farm has been so managed that this very large amount of work has been accomplished without serious cost. When completed, we shall have an orchard and fruit garden very conveniently arranged to secure all necessary conditions of healthy growth and development.

It has been decided to give much less time to what are known as variety tests. At best, such tests can only determine such things as concern the given locality and the soil upon which they are made. Our main object in all the work we shall do in the growing of fruits or vegetables upon the Station Farm will be to seek the best methods by which we can maintain healthy, fruitful growth, and how to combat the insect pests and fungus enemies, under as well as above ground, which are everywhere the cause of ruin to the trees, fruits and vegetables in this latitude.

Meanwhile we have not lost sight of that sort of investigation into the adaptation of plants of all kinds to the various conditions, whether of prevailing winds, temperature, altitude, or soils, which is really the only manner in which variety tests can be intelligently conducted. For this part of our work we have sought, and I am glad to say that we are receiving, the generous help of our people, from the mountains to the Mississippi River. Out of such effort will come, sooner or later, such measure of success as will surely recompense all our labor and trouble.

During the year 1893 the following bulletins were issued:

No. 1. "Some Injurious Insects of the Apple." Of this bulletin 5,000 copies were issued, and were sent to our correspondents throughout the State, and have been supplied upon subsequent demand until very few copies are now left on hand.

No. 2. "The Rational Use of Feeding Stuffs. Winter Dairying in Tennessee." 5,000 copies were issued and have been distributed by the Station. By permission, nearly as many more have been printed and distributed throughout the country without cost to us.

No. 3. "Small Fruits:—Strawberries, Raspberries, Blackberries, Grapes."

No. 4. "Field Experiments with Tomatoes and Onions. The Boll-worm, Corn-worm, or Tomato-worm (*Heliothis armiger*, Hubn.)." Of these two bulletins a like number, 5,000 each, have been distributed to our correspondents, and have been asked for and sent to many hundred of others in the State and elsewhere.

A cordial understanding was had with the State Bureau of Agriculture, and plans were made by which the Bureau at Nashville has greatly assisted in making the work of this Station of genuine value to all parts of the commonwealth.

On the 1st of July, 1894, the organization of the Station was changed somewhat, because of the appointment of Professor F. Lamson-Scribner to be Agrostologist of the U. S. Department of Agriculture. With the same Executive Committee, the Station Council is now:

CHAS. W. DABNEY, JR., *President.*
CHAS. F. VANDERFORD, *Secretary.*
J. B. MCBRYDE, *Chemist.*
R. L. WATTS, *Horticulturist.*
S. M. BAIN, *Botanist.*
CHAS. E. CHAMBLISS, *Entomologist.*
CHAS. A. MOOERS, *Assistant Chemist.*
THOS. F. PECK, *Farm Foreman.*

During the current year we have issued bulletins:

No. 1. "The Grasses of Tennessee." This bulletin contains one hundred and eighty-seven illustrations, carefully drawn from specimens in the herbarium of the Station, with appropriate descriptions of each.

It is a valuable contribution to the agricultural literature of the State, furnishing, as it does, such information as every farmer must have who would properly manage his meadows and his pastures. With this bulletin at hand, every intelligent farmer in the State should be able to recognize any grass, of whatever character, useful or injurious, found native in his fields or woodland pastures, or introduced as commonly-called cultivated grasses. He can now know their general appearance, habits of growth, time of seeding, and so be able to rid himself of such as are of little or no value, and protect such as he wishes to grow most abundantly.

No. 2. "FRUITS: Grapes, Strawberries, Raspberries, Blackberries, Pears, Apples and Peaches," gives concisely the results of the work so far with these fruits upon our grounds, both at the University and at the Farm, and sets forth clearly enough the proposed work of the future by the Horticultural Department of the Station.

No. 3. "Co-operative Experimentation;" a Bulletin of Progress printed to comply with the promise made to those who gave their help toward the conduct of certain investigations set on foot by the State Bureau of Agriculture and the Experiment Station; as well as to inform our people more particularly about the new and better method, adopted by the Secretary of the U. S. Department of Agriculture, to disseminate such new seeds and plants as are most likely to be of value in the State.

No. 4. "Dehorning Cattle" explains as simply and clearly as possible the process of dehorning cattle, with suggested precautions with respect to cows giving milk, and the almost painless operation for preventing the growth of horns of calves. It is certain that when the advantages of dehorning are fully understood, and when the impression that the operation is needlessly cruel is once removed, every farmer and stock-breeder will be glad to know how and when the work can be done in the safest and most expeditious way.

CHAS. W. DABNEY, JR.,
President.

CHEMICAL DIVISION.

DR. CHAS. W. DABNEY, JR., *President.*

DEAR SIR:—The following report of the work of the Chemical Division of the Experiment Station for the year 1893-94 is respectfully submitted:

During the early part of the year work on the study of the virgin soils of the State was continued; some twenty analyses of soils and subsoils were completed. This practically completes the chemical work on soils. We have examined in the laboratory fifty odd samples of soils and subsoils, and have made complete chemical analyses of forty-eight samples. These samples, representing as they do all the typical soil areas of the State, were carefully selected by Secretary Chas. F. Vanderford; a description of the method of obtaining the samples being given in the Fifth Annual Report. This Station now has on hand sufficient data to make an exceedingly valuable report on the soils of this State, and it is the intention of those in charge to publish these results as soon as possible.

After the completion of the soil analyses, work was begun on a study of the starch content of the Irish potato. All growers of Irish potatoes, residents of the State, were invited to send us for analysis samples of their seed potatoes; unfortunately, only two growers took advantage of this opportunity, namely Jno. C. Bridgewater of Mount Juliet, and Hugh L. Craighead of Nashville. Mr. Bridgewater sent in six samples and Mr. Craighead one. These seven samples, with one from the Station Farm, were the only samples of seed potatoes sent us. All persons sending samples of seed potatoes were also requested to send us samples of potatoes from the resulting crop; and in response to this request we received, with the exception of eight samples from the Station Farm, but one sample, and that from Mr. Craighead of Nashville. Although much disappointed by the apparent lack of interest in the problem of improving the Irish potato crop in the State, we feel that something has been accomplished in making a start; and we hope that another year will show an improved interest in this important work.

Eight samples of sorghum cane, grown from seed sent out by the United States Department of Agriculture, were examined for sugar; and it is the present policy of the Station to continue this work next year.

During the early part of October we received the first samples of sugar beets, and they continued to come in until about the first of De-

cember. We received in all only twenty-eight samples; six of these, not being accompanied by the proper records, were thrown out. This was a surprisingly small number of samples, when we take into consideration the fact that more than a thousand samples of seed had been sent to various parties throughout the State. However, some good has certainly been accomplished, in spite of the small number of samples sent in; the analyses show that a number of the beets were of excellent quality, and we hope that another year's test will show even better results upon soils of similar character to those growing beets showing a high per cent. of sucrose.

During the present year Mr. C. A. Mooers has had charge of the fertilizer work, making analyses of all the samples received during that time. It gives me pleasure to testify to the thoroughness and care with which Mr. Mooers has executed his work. For the State inspection of fertilizers, there have been analyzed in this laboratory, since July 1st, 1893, 208 samples of fertilizers; and 18 samples of phosphate rock, all of the latter from the phosphate rock deposits in Tennessee.

It will be the policy of the Station to continue the work on the Irish Potato, Sorghum Cane, and Sugar Beet; and it is to be hoped that next year we may meet with more hearty co-operation on the part of the farmers throughout the State.

It is intended to begin at once a study of the cotton-seed meals as found on the markets; special attention will be paid to the adulteration and deterioration of the meal. Our main object will be to find, if possible, some means whereby the consumer may be protected from impure meals.

The Station laboratory is now in excellent condition for doing good work. During the past year we were able to purchase some much needed apparatus and supplies; and we may safely say that the laboratory is now in better condition for good work than ever before. Among the pieces of apparatus purchased were a very fine analytical balance and set of weights; a balance for coarse weighings up to ten pounds, and set of weights; platinum crucibles and dishes; platinum cylinders for the electrolysis of copper; two dozen batteries for electrolytic work; glass ware; porcelain ware; apparatus for general laboratory use; chemicals, etc.

Another room has been added to the one already used by Mr. Mooers for fertilizer work, and he now has his laboratory in good shape for work. The laboratory stands in great need of a bath suitable for the estimation of available phosphoric acid, the bath now in use, besides being of very inconvenient shape and in bad condition, has been in use for a number of years. A large drying oven is also much needed, the one at present in use being entirely too small. We also need the apparatus for carrying on at one time a number of ether extractions in feed stuffs. These pieces of

apparatus, with the general supplies and chemicals, will put the laboratories into strictly first-class condition for doing almost any kind of work.

The analytical work for the year may be summarized as follows:

Samples of fertilizers	208
" " phosphate rock	12
" " soil	20
" " Irish potatoes	17
" " sorghum cane	10
" " sugar beets	22

Respectfully,

Dec. 6, 1894. J. B. McBRYDE,
Chemist.

HORTICULTURAL DIVISION.

DR. CHAS. W. DABNEY, JR., *President.*

DEAR SIR:—The following report of the Horticultural Division of the Experiment Station for the years 1893–'94 is respectfully submitted:

The most prominent work of the Horticultural Division has been an investigation of the apple industry in Tennessee. No field of research is more promising of valuable results than this. The study was actually begun in January, 1893, with the following objects in view: 1st, to ascertain the varieties which have been found best adapted to various sections of the State; 2nd, to locate and test seedlings of special merit; 3d, to determine the adaptability of soils, exposures, and locations for apple culture or for given varieties; 4th, to study native varieties and seedlings with a view to originating new and better sorts by hybridization.

Hundreds of letters have been written fruit-growers throughout the State inquiring about varieties, soils, locations, exposures, etc. The responses have been very encouraging. Much valuable information has been secured and properly recorded. A large number of promising seedlings have been found, and in many instances specimens of the fruit have been sent to the Horticultural Division for examination. Some of the apples thus secured were very handsome, large, and of superior flavor. These samples when received were photographed, showing the size of the whole apple and also a half section, thus preserving an accurate record of its shape, core, seed, stem, and even the grain of the flesh.

Careful notes were made upon their color, flavor, size, etc. Cions of promising seedlings will be secured the coming spring, and grafted on bearing trees in the Station orchard. By this method fruit will be obtained in two years. If after fruiting the seedling merits further trial, trees will be propagated, planted on the farm, and also distributed among

intelligent orchardists for thorough testing elsewhere. The Division is collecting data which which will render it possible to publish a catalogue of Tennessee apples. Such a catalogue is greatly needed, as the nomenclature of this fruit in our State is in a very unsatisfactory condition. It is hoped that models of the fruit of the more prominent varieties may be secured for the Station museum. No apples were harvested in the Station orchard this year on account of the severe March freeze.

In the last annual report of this Division, mention was made of a pear orchard begun on the College farm. The trees were carefully sprayed during the past summer, and no fungous diseases have yet appeared. The trees have made strong healthy growth. Over a hundred additional trees will be planted next spring.

In Bulletin Vol. VII., No. 2, a chapter is devoted to the peach industry of Tennessee. The production of this fruit has been greatly neglected, and every possible effort will be made to promote its cultivation. An investigation as to varieties, soils, locations, etc., similar to that of apples has been instituted.

A full report upon the experiments with grapes is given in the October Bulletin of the Horticultural Division. The March freeze greatly reduced the crop; notwithstanding many varieties yielded quite abundantly. It is hoped that every variety in the vineyard will fruit in 1895. Preparations are being made to establish a new vineyard on the College farm next spring.

The usual attention has been given the cultivation of strawberries, raspberries and blackberries. Brief chapters are devoted to these fruits in the Bulletin above referred to.

Special experiments were conducted with onions and lettuce. No report has been made of the work of the year; but a careful record of the facts obtained has been preserved. The experiments with these vegetables will be continued next year. A general garden without any special line of work proved quite remunerative.

Early in the fall the decayed parts of the frame-work of the greenhouse were replaced with new wood. The house being unfit for accurate experimental work, it has been used mainly for the culture of flowers and decorative plants. A new greenhouse is greatly needed to conduct certain investigations. and it is earnestly hoped that such a structure will be erected next summer.

A vile weed, Wild Onions (*Allium vineale*, L.) is spreading at an alarming rate throughout the State. It is especially abundant along streams and is being rapidly introduced into rolling, hilly and even mountainous districts. The difficulty with which the wild onion is eradicated, renders it one of the most dangerous weeds in the State. The Horticultural Division is conducting a large number of experiments both in the field and

under glass with the hope of finding a successful method of combating this dreaded pest. Some valuable facts have already been obtained concerning its habits of growth.

The Horticulturist has given considerable attention to Institute work. Several meetings of Horticultural Societies were attended. Preparations for the annual meeting of the East Tennessee Horticultural Society consumed some time. At the latter meeting the Horticultural Division made an exhibit of decorative plants, fruits, vegetables, implements, etc.

Respectfully,

Dec. 6, 1894.

R. L. WATTS,
Horticulturist.

BOTANICAL DIVISION.

DR. CHAS. W. DABNEY, JR., *President.*

DEAR SIR:—The undersigned assumed his duties as botanist on the first of July, 1894. Up to that date he was engaged working on the Grasses of Tennessee, and in other ways assisting the former botanist.

Most of the time has been employed in the herbarium. A large number of unmounted specimens had accumulated, which have been or are being mounted, classified, catalogued, and assigned to their proper places in the collection. The collection of duplicates has been carefully gone over and rearranged. The botanist has contributed his own collection of duplicates, made during two years' residence in West Tennessee. It is our purpose to accumulate, as opportunity may permit, all the native and adventive species of plants growing in the State; also, enough material from other parts of the country to enable us to study our own intelligently. The notes and specimens thus acquired will enable us at any time to make a report on our valuable timbers, injurious weeds, soil distribution of native plants, parasitic fungi, or other matters of practical importance. During the year there have been added to the collection about 3,500 specimens. Most of these have come by exchange with other collections. There are included in this number about 1,200 specimens of fungi. It is the purpose of the botanist to pay special attention to this feature of the collection in the future.

We are beginning a series of experiments on the fungous diseases of our cultivated crops, those of the peach to receive special attention during next season. It is respectfully recommended that provision be made for conducting experiments under proper control on the life histories of fungi, and for investigating other physiological questions that have immediate bearing on agriculture. For this work we need hot-house room and some special apparatus.

Respectfully submitted,

Dec. 6, 1894.

SAMUEL M. BAIN,
Botanist.

ENTOMOLOGICAL DIVISION.

DR. CHAS. W. DABNEY, JR., *President.*

SIR:—I have the honor to submit the following report of my work since July 1st. 1894, at which date this division was re-established:

Attention was at once given to the collection, which was far from being in the proper condition for reference or study, because of the fact that no one had direct and special charge of it for the past three years. Much work has been done in classifying the material on hand, and before spring opens most of the insects will be named and arranged according to the latest classification.

For the work of next year, it is designed to study the life histories of those insects which are known as "true bugs," *Heteroptera*. Many of these insects are injurious to vegetation, and a few are indirectly beneficial to man by preying upon the noxious species. To pursue this work in a proper manner, breeding cases and a suitable place for them are to be secured. Aside from these additions, I ask that the division be supplied with insecticides and the necessary machines for spraying.

Besides studying the life histories of "true bugs," a biologic collection will also be made of the economic species. This collection will contain, so far as possible, the egg, larva, pupa and imago of each species, its parasites, and samples of its injury or work. Such a collection will be more educational to the farmer and the economic student than a systematic one, and should not be neglected.

The usefulness of this division can be further extended by a close association with the farmer. This can only be possible by personal contact with them, and I ask that some provision be made that I may get before them at least twice a year.

I have reason to believe that the work of this division can be made of great value to the farmers and horticulturists of the State, and feel sure that my expectations will be fully realized, if the division is given the necessary support.

Yours respectfully,

Dec. 6, 1894.

CHAS. E. CHAMBLISS,
Entomologist.